

## **AMENDMENTS TO THE SPECIFICATION**

Please replace Paragraphs [0082] through [0085] with the following paragraphs [0082], [0082.1], [0083], [0084], and [0085], rewritten in amendment format:

[0082] With reference to Figure 9, a detail portion of the combustor 14, similar to the portion illustrated in Figure 3, according to various embodiments of a heat exchanger 145 is illustrated. A premix chamber 142 allows air from the compressor to be mixed with a first portion of fuel. Air comes from the compressor and travels through a cooling fin or channel rather than through a plurality of cooling tubes 44, as discussed above in relation to the first embodiment. It will be understood that a channel can be defined by a fin, a wall, a member, or any appropriate structure. The figure only exemplary illustrates a passage that can be defined by a channel or fin.

[0082.1] It will be understood that exit ports may also be formed in the cooling ~~[[fins]] channels~~ 144 to form the premix area 142. The cooling ~~[[fin]] channel~~ 144 is defined by two substantially parallel plates 144a and 144b. It will be understood, however, that other portions, such as a top and a bottom will be included to enclose the cooling ~~[[fin]] channel~~ 144. Additionally, a heat exchange or catalyst ~~[[fin]] channel~~ 148 is provided rather than heat exchange tubes 48, as discussed above in the first embodiment. Again, the catalyst ~~[[fin]] channel~~ 148 is defined by side, top, and bottom walls and defines a column 149. Each catalyst column 149, however, is defined by a single catalyst ~~[[fin]] channel~~ 148 rather than a plurality of catalyst tubes 48, as discussed above. The cooling ~~[[fin]] channel~~ 144 may include a plurality of cooling ~~[[fins]] channels~~ 144. Each cooling ~~[[fin]] channel~~ 144, in the plurality, defines a cooling pathway. Similarly, the heat exchange ~~[[fin]] channel~~ 148 may include a plurality of

heat exchange channels 148 **[[fins]]**. Each, or the plurality of, the heat exchange **[[fins]]** channels 148 defines a heat exchange or catalyst pathway.

**[0083]** Channels Additional channels 150 are still provided between each of the catalyst **[[fins]]** channels 148 so that air may flow from the compressor through the cooling**[[fins]]** channels 144 into the premix chamber 142. Air is then premixed with a first portion of fuel and flows back through the catalyst **[[fins]]** channels 148 to the main injector plate 152. Injection ports 160 are provided on the main injector plate 152 to inject fuel as the air exits the catalyst **[[fin]]** channel 148. A suitable number of injection ports 160 are provided so that the appropriate amount of fuel is mixed with the air as it exits the catalyst **[[fins]]** channels 148. An intra-propellant plate 54 is also provided.

**[0084]** Injector ports 60 or 90 are still provided on the main injector plate 152 to provide fuel streams 76 or 92 as heated air exits the oxidizer paths (not particularly shown) from the catalyst **[[fins]]** channels 148. Either of the previously described injector ports 60 or 90 may be used with the second embodiment of the heat exchanger 145 to provide a substantial mixing of the fuel with the air as it exits the catalyst **[[fins]]** channels 148. This still allows a substantial mixture of the fuel with the air as it exits the catalyst **[[fins]]** channels 148 before the fuel is able to reach its ignition temperature. Therefore, the temperatures across the face of the main injector 152 and in the combustion chamber 34 are still substantially constant without any hot spots where NOX chemicals might be produced.

**[0085]** It will also be understood that the cooling **[[fins]]** channels 144 may extend into the pre-mixer 142 similar to the cooling tubes 44. In addition, ports may be formed in the portion of the cooling **[[fins]]** channels 144 extending into the pre-mixer to

turn all the air exiting the cooling fins and mix with a first portion of fuel. Therefore, the combustor according to the second embodiment may include a pre-mixer 142 substantially similar to the pre-mixer illustrated in Figure 5, save that the ports are formed in the cooling ~~[[fins]]~~ channels 144 rather than individual cooling tubes 44. In addition, this alternative embodiment may include a combustion inhibitor to assist in eliminating combustion in the pre-mixer 142.